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"PATENT"

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
GROUP ART UNIT 3671

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In re

Patent Application of

Megens

Serial No. 08/747,873

Filed: November 13, 1996

Examiner: H. Shackelford

MOVABLE LOADING BRIDGE HAVING
AN INFLATABLE FLEXIBLE BODY

I, Mary Beth Geipel, hereby certify that this correspondence is being deposited with the US Postal Service as first class mail in an envelope addressed to Assistant Commissioner for Patents, Washington, D.C. 20231, on the date of my signature.

Mary Beth Geipel
Signature

Aug. 23, 2001
Date of Signature

AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

This Amendment is in response to the Office action dated March 27, 2001 and the Notice of Non-Compliant Amendment dated August 7, 2001. Applicant respectfully requests the Examiner to consider the following Amendment and Remarks.

IN THE SPECIFICATION:

Please replace col. 1, paragraph 1 – col. 4, paragraph 8 with the following:

---Application No. 09/598,785, filed June 20, 2000, is a continuation of this reissue application which is a continuation of Application No. 08/532,415, filed September 22, 1995, now abandoned.

The present invention relates to a bridge for making a connection between a loading platform and a vehicle, wherein the bridge is hingedly connected to the platform, and wherein the height of the bridge at the side of the vehicle is variable.

Such loading bridges are generally known. Often these loading bridges are driven for their vertical movement through a hydraulic apparatus. In such devices, a cylinder is provided between a fixed point and a point of the bridge, so that the loading bridge can be moved in the vertical direction and can even be locked.

Also loading bridges are known, which are operated by hand, and which rest at the movable side on the loading floor of the vehicle.

All of these known loading bridges have a number of disadvantages; for example manually operated loading bridges can only be applied until a certain weight, as otherwise they become too heavy and cannot be moved by human power.

Big loading bridges, which often comprise a hydraulic drive, have the disadvantage that these hydraulic apparatus are rather costly, so that the price of such loading bridges is substantial. The same disadvantage also exists when the loading bridge is driven by an electric motor and a rack and pinion.

The present invention provides such a loading bridge, which can be provided with a driving mechanism for a relatively modest cost, despite its substantial dimensions.

This aim is achieved, in that under the bridge a flexible body has been provided of which the volume of the flexible body increases when it is filled with a gas.

As the price of such a flexible body is modest, and the filling thereof requires only low priced equipment, a rising mechanism for such a bridge is provided, which can be manufactured for a modest cost. Thus the cost of such a loading bridge is decreased considerably. In this

respect the remark is made, that the bridge only has to be lifted in its unloaded condition; hence there is no need for substantial power, so that relatively light and simple pneumatic apparatus is satisfactory.

Subsequently the present invention will be elucidated with the help of the accompanying drawings, wherein:

FIG. 1: is a schematic perspective view of a closed loading platform comprising a loading bridge;

FIG. 2: is a schematic exploded view of a first embodiment of a loading bridge according to the present invention;

FIG. 3: is a schematic cross-sectional view of the first embodiment of a loading bridge according to the present invention;

FIG. 4: is a schematic perspective view of a second embodiment of a loading bridge according to the present invention;

FIG. 5: is a cross-sectional view of an alternative embodiment for the controlling mechanism of the lid of the loading bridge according to the present invention; and

FIG. 6: is a perspective view partially broken away of a third embodiment of the present invention; and

FIG. 7: is a cross-sectional view, partially as a side view of the embodiment depicted in FIG. 6.

The loading platform 1 depicted in FIG. 1 comprises a pit 2, in which a loading bridge 3 has been provided. In the present case the loading platform 1 is covered by a wall 4 and a roll down shutter 5 which has been provided in the wall at the location of the loading bridge 3.

A vehicle to be loaded, for instance a lorry, drives with its rear side as close as possible against the loading platform 1, wherein the rear side of the lorry hits the buffer 6. Then the roll down shutter 5 is moved upwardly, and the height of the loading bridge 3 is adapted to the height of the rear side of the lorry, so that the lorry can be loaded easily. It is convenient to drive into the lorry from the loading platform with for instance fork lifts.

FIG. 2 shows an exploded view of such a loading bridge according to the present invention. The loading bridge comprises a housing, which is composed of two fixed sides 7, which have been folded zigzag-wise, and also a rear wall 8. The rear wall comprises reinforcement pieces 9, which are mutually connected through bars 10. When providing such a loading bridge in a loading platform, the loading bridge is located as a whole in a desired position, after which the loading platform is formed in concrete. Thus the sides 7, the rear wall 8, the reinforcement pieces 9 and the bars 10 function as a lost formwork.

The housing supports a base 11, which comprises a substantially horizontal part 12 and a part 13 extending obliquely downward to the front at an angle θ of about twenty-two degrees (See FIG. 3). Angle θ as illustrated in FIG. 5 is about fifteen degrees. Also the bottom of the base 11 comprises a front wall 14 extending obliquely upwardly. The loading bridge per se comprises a movable plate 15, which is manufactured of steel or aluminum: and to the lower side thereof reinforcement ribs 16 have been welded. Further a round rod 17 has been welded to the under side of the plate 15, which rests in an array of substantially L-shaped hooks 18 welded against the back wall 8. Finally a filling piece 19 has been welded against the lower side of the plate 15, which filling piece 19 can be manufactured from a steel box or may be composed of rather light material, like tempex.

At the lower side of the plate 15 a lid 21 has been hingedly connected by means of hinges 20.

In the space between the filling piece 19 and the oblique part 13 of the base 11, a flexible bag or bellows 22 has been provided, which may be manufactured from for instance polyethylene. The form of this bag is such that it fits in the space thus provided. Further this bag comprises a connection 23, which fits into a hole 24 provided in the bottom. Through this connection a gas, for instance air can be supplied, and which can fill the bag 22, so that the bridge 15 is raised thereby.

The cross-sectional view shown in FIG. 3 shows how the bag 22 is locked up in the space between the oblique part 13 of the bottom and the filling piece 19. The bag may be connected with the lower side of the filling piece by for instance adhesive or buttons 60. Further it is shown how a ventilator 26 can blow up the bag 22 through a tube 25 against the spring pressure of a one-way valve 27. Further a valve 28 with pressure dependent action has been provided in the tube, which lets a part of the air flow out when the pressure in the bag becomes too high, so that the loading bridge under a changing load, for instance the driving on and off a fork lifter, does not suddenly jump upwardly. Instead of a ventilator, a compressor with a venturi can be used.

Further in the drawing it is shown how the vehicle lift 29 can be moved from a lorry 30 until under the space under the apparatus, so that it does not interfere the loading and unloading. To avoid wear of the bag during the movement of the loading bridge, the front wall 14 thereof is formed such, that the bag wall rolls off or on, when moving the loading bridge. The same feature has been applied with the side walls; the wall of the bag rolls as a membrane on or off against the side wall 19. Besides these side walls 19 serve to protect the bag, 22 in the highest position of the loading bridge.

Further it is shown in this figure how the lid 21, which is connected with the bridge 15 by means of a hinge 20, is provided with a rod mechanism 31, that provides for the fact, that the lid 21 is usually in its inward position, whereas when reaching the highest position of the loading bridge the rod mechanism forces the lid upwardly, so that this is in the position shown with drawn lines in the figure, after which the loading bridge may descend until the position, in which this connects on the loading floor of the lorry 30, and rests on the frame of the lorry or on the loading floor thereof. The lid 21 is kept in this position by a cam 32 welded thereon by a folded rod 33, which is connected with the loading bridge 15 by means of a hinge 34, and a rod 35 connected hingedly with the other side thereof, which rod comprises a thickening 36 at its lower side. The rod 35 extends through an aperture in the front plate 14.

When reaching the upper position of the loading bridge, the thickening 36 in the rod 35 exerts a force to the folded rod 33, so that the folded rod 33 moves the lid 21 to its extended position. This position is maintained by the cam 32 when the loading bridge moves downwardly.

In FIG. 4 another embodiment of the loading bridge is shown, in which another plate 15 of the loading bridge, a network of thin metal strips 36 have been provided, so that a honeycomb-like structure develops. This results in a lighter construction of the reinforcement of the loading bridge, which may considerably reduce the costs thereof. This construction is only allowed because the forces of the loading bridge are borne by the whole underside thereof, so that the construction for the concentrating of the forces to one point, which was necessary when using a hydraulic drive, is superfluous. This has of course a very favorable outworking on the price. Further this loading bridge comprises a rod system 37 and a spring 38, which also provides that during the descending only of the loading bridge the lid 21 is in its extended

position. Further the bag can be made so large, that is pushes directly against the lower side of the bridge and makes the filling piece superfluous.

In this embodiment, a front skirt 52 and side skirts 53 are provided extending downwardly form the underside of the bridge. When the bag is deflated, it is folded within the front and side skirts, and the front skirt is adjacent the front wall 14. As the bag is inflated, side portions of the bag are played out off of the skirts onto the front wall and the side walls of the housing.

This is further elucidated with the help of FIG. 5. When moving upwardly, the compression spring 38 will urge the rod system 37 outwardly, which is avoided by the cam 39. When the bridge has reached its highest position, the chain 40 will pull the rod system 37 downwardly and outwardly, so that the lid 21 is urged to its extended position. During the following the descending of the bridge, the rod system 37 will be received by a top 41, which urges the rod system and the spring 38 back to their original positions.

Of course a lot of other possibilities are available for the controlling of the lid 21.

In the embodiment of the loading bridge depicted in FIG. 6 and 7 the bag 22 has been replaced by a bellows 41, such as an air spring.

The construction of this embodiment of the loading bridge 3 is substantially equal to the embodiment depicted in FIG. 1-3. The present embodiment is different, because no bag exists and therefore no housing in which the bag 22 is enclosed is necessary. The only reason for nevertheless applying a full housing is the use thereof as lost formwork. This is of course also possible together with the application of a bellows.

A frame 43 is used, of which the plate 15 of the loading bridge is provided hingedly, in a way substantially as in the first embodiment. For bearing the load of the frame on the base two

brackets 44 have been provided. Further in this embodiment the plate 15 is reinforced by spars 42. The bellows rests with its bottom on the horizontal part of the bracket 44, whereas the top thereof is connected with a plate 45, being connected with the two middle spars 42.

Further the side wall of the loading bridge is composed of plates 19, which avoid, that part of the body that becomes squeezed between the frame and the bridge.

Besides the construction of the bellow that is depicted in FIG. 7. The bellows 41 comprises a bottom plate 46, which is connected on the horizontal part 44 through an intermediate piece 47. The bellows per se, which is composed of a flexible bag 48, for instance made of rubber or of plastic, is connected with the base plate 46 and a top plate 49. To avoid extension of the bag 48 in the horizontal direction two rings 50 have been provided.

Through a pipe 51, extending through the intermediate piece 47 and the base plate 46 a gas, for instance air can be supplied to make the volume of the bag 48 increase. In view of the supply of air or a gas refer to the embodiment described with the help of FIG. 3.

Several features of the different embodiments can be mutually combined.--

IN THE CLAIMS:

NOT ENTERED Rule 1.173

1. (Thrice amended) Loading bridge for making a connection between a loading platform and vehicle, comprising:

a substantially planar member pivotally connected to the loading platform and capable of bearing a load, wherein a rear edge portion of said substantially planar member is hinged along a surface of the loading platform, and wherein a front edge is movable in a direction perpendicular to said surface of the loading platform;

an inclined base positioned under the substantially planar member, and

pivot means for pivoting said substantially planar member, said pivot means comprising an inflatable flexible body positioned on the inclined base.

Cancel claim 8.

25. (Amended) A loading bridge as claimed in claim 1, wherein said inclined base is inclined between one and eighty-nine degrees.

26. (Amended) A loading bridge as claimed in claim 1, wherein said inclined base is inclined between five and eighty-nine degrees.

27. (Amended) A loading bridge as claimed in claim 1, wherein said inclined base is inclined between fifteen and eighty-nine degrees.

Please add the following new claim:

28. A loading bridge and loading platform assembly for making a connection between the loading platform and vehicle, comprising:

a pit floor located within the loading platform;

a substantially planar member pivotally connected to the loading platform and capable of bearing a load, wherein a rear edge portion of said substantially planar member is hinged along a surface of the loading platform, and wherein a front edge is movable in a direction perpendicular to said surface of the loading platform;

an inclined base positioned under the substantially planar member and above the pit floor, and

pivot means for pivoting said substantially planar member, said pivot means comprising an inflatable flexible body positioned on the inclined base.

IN THE DRAWINGS:

Applicant is submitting herewith amended FIGS. 3 and 5 along with a separate cover sheet.

REMARKS

Claim 8 has been cancelled and claim 28 has been added such that claims 1-7, 9-15 and 25-28 are pending in this application. Applicant initially notes that claims 13-15 have been allowed. Applicant respectfully requests the allowance of all of the pending claims.

The Examiner states that Applicant must cross-reference the continuation reissue Application No. 09/598,785 in the first sentence of the specification. Applicant has amended the specification to include the cross-reference to Application No. 09/598,785.

The Examiner states that the information disclosure statement submitted by the Applicant on December 18, 2000 failed to comply with 37 C.F.R. 1.97(c) because it lacked the fee set forth in 37 C.F.R. 1.17(p). In response, Applicant notes that the IDS was accompanied by a statement in compliance with 37 C.F.R. §1.97 (c)(1). Nevertheless, in order to expedite prosecution of this application, Applicant authorizes the fee as required under 37 CFR §1.17(p) to be charged to Deposit Account No. 13-3080.

Claim Rejections 35 U.S.C. §251

The Examiner rejects claims 1-12 and 25-27 as being improperly broadened with the term "substantially", which was recommended by the Board of Patent Appeals and Interferences. As suggested by the Examiner, Applicant has deleted the term "substantially" from line 6 of claim 1 and respectfully requests the Examiner to remove the rejection of independent claim 1 and dependent claims 2-7 and 9-12 and 25-27.

The Examiner also rejects claims 25-27 under 35 U.S.C. §251 as being improperly broadened with the language of "at least one degree", "at least five degrees", and "at least fifteen degrees". Claims 25-27 have been amended to include ranges between one and eighty-nine degrees, between five and eighty-nine degrees, and between fifteen and eighty-nine degrees, respectively. These claims are, in fact, narrower than the original claims, and therefore do not warrant an "improper" rejection under §251. Applicant respectfully requests the Examiner to remove the rejections of claims 25-27.

Drawing Objections

The Examiner objects to the drawings submitted on December 19, 2000 because the reference numeral 11 incorrectly designates the floor of the pit in the loading platform instead of the base. In response, Applicant submits revised drawing sheets that delete the reference numerals 11 from Figs. 3 and 5 and respectfully requests the Examiner to withdraw the objection to the drawings.

Disclosure Objections

The Examiner objects to the disclosure because the Examiner states that the specification is replete with grammatical errors, misspellings, and is written in a generally awkward manner. Applicant points out that the specification, as originally filed, is sufficiently clear to appraise one of ordinary skill of the nature of the invention. Nevertheless, Applicant has amended the examples cited by the Examiner and other such instances in an attempt to clarify the disclosure. Applicant respectfully requests that the Examiner withdraw the objection to the disclosure in light of the Applicant's amendments to the specification.

Amendment Objections 35 U.S.C. §132

The Examiner objects to the amendment filed December 19, 2000 under 35 U.S.C. 132 because the Examiner believes that the amendment introduces new matter into the disclosure. The Examiner contends that the application, as originally disclosed, does not provide support for the newly inserted language in the fourth paragraph of col. 2, which states that the part 13 extends obliquely at an angle of "about twenty two degrees" and "about fifteen degrees."

In response, Applicant notes that "information contained in any one of the specification, claims, or drawings of the application as filed may be added to any other part of the application without introducing new matter." MPEP 2163.06. Originally filed Figs. 3 and 5 show part 13 extending downward at an angle of about twenty-two degrees and about fifteen degrees, respectively. Because these angles are disclosed in the originally-filed drawings, the Examiner should withdraw the objection to the amendment and enter the amendment into the specification. However, should the Examiner maintain the objection, Applicant respectfully requests that the Examiner cite authority for his position that specific angles shown in the drawings cannot be entered into the specification.

Claim Rejections 35 U.S.C. §112

The Examiner rejects claims 26 and 27 under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor had possession of the invention at the time the application was filed. The Examiner considers the inclusion of the angles at which the inclined base extends (e.g., "at least five degrees" and "at least fifteen degrees") to be new matter since the Examiner believes that the specification, as originally filed, does not provide a basis for such language.

Applicant disagrees with the Examiner and asserts that the amended claimed ranges of claims 26 and 27 for the inclined base were disclosed in the original specification. Specifically, the original specification describes providing a base "which comprises a substantially horizontal part 12 and a part 13 extending obliquely downward to the front" (col. 2, lines 28-30). One of ordinary skill in the art would recognize that an oblique angle is neither perpendicular nor

parallel, and therefore that part 13 could be angled anywhere between 0 and 90 degrees, non-inclusive, relative to horizontal (i.e., angle θ in Figs. 3-5).

An amendment that narrows an originally disclosed range is not new matter if the amendment is consistent with the original teachings and the amendment does not cover an invention that is different from that originally claimed. *See* Helene Curtis Industries, Inc. v. Sales Affiliates, Inc., 121 F. Supp. 490, 101 U.S.P.Q. (BNA) 220 (D.N.Y. 1954)(holding that the narrowing of a pH range was not invalidating new matter); Girdler Corp. v. I.I. Du Pont de Nemours & Co., 152 F. 2d 757, 68 U.S.P.Q. (BNA) 462 (3d. Cir. Del. 1946) (holding that the narrowing of a frequency range was new matter because the amendment was derived from a separate inventive act and therefore claimed a different invention). Prior to the addition of claims 26-27, independent claim 1 recited a loading bridge that included an inclined base. Dependent claims 26-27 merely narrow an originally disclosed range that is understood from the specification to be between 0 and 90 degrees, non-inclusive. In addition, claim 1 remains directed to the same invention, specifically, a loading bridge that includes an inclined base. Therefore, claims 26-27 do not include new matter and Applicant respectfully requests the Examiner to remove the 112 rejection of claims 26-27.

The Examiner also rejects claims 25-27 under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains to make and/or use the invention.

Dependent claims 25-27 depend from independent claim 1. Claim 1 recites a loading bridge for making a connection between a loading platform and a vehicle. The loading bridge includes a substantially planar member, an inclined base, and a pivot means. The planar member is pivotally connected to the loading platform and capable of bearing a load. The planar member

includes a rear edge portion and a front edge portion. The rear edge portion of the planar member is hinged along a surface of the loading platform and the front edge is movable in a direction that is perpendicular to the surface of the loading platform. The inclined base is positioned under the substantially planar member. The pivot means for pivoting the planar member includes an inflatable flexible body that is positioned on the inclined base.

Claims 25-27 narrow the limitations of claim 1 in that they define the inclination of the base between 1 and 89 degrees, 5 and 89 degrees, and 15 and 89 degrees, respectively. The Examiner states that the lower limits of 1 and 5 degrees of claims 25 and 26, respectively, are not enabled because the Examiner contends that such small angles would not allow the ventilator to be positioned under the base. Claim 1 does not recite a ventilator and it does not recite a ventilator positioned under the base. In addition, there is no indication that positioning the ventilator under the base is a necessary or critical part of the invention. Therefore the Examiner's enablement argument is not understood regarding claims 25-26.

In addition, the Examiner states that the upper limit of 89 degrees set forth in claims 25-27 could not perform the intended function of pivoting the member. However, the specification does not limit the shape of the bag except to the extent that the bag is capable of raising the bridge and fitting within the space provided between the loading bridge and the base (col. 2, lines 46-54). Applicants submit that a person of ordinary skill in the art would be sufficiently enabled to design a bag that would raise the loading bridge from a base that was inclined 89 degrees. Since a wedge shaped bag is disclosed, one of ordinary skill would recognize that a larger wedge shaped bag could be used for a larger inclined base. Although this arrangement may not work as efficiently as others, one of ordinary skill in the art would understand how to configure a bag that would raise the loading bridge when the base is inclined 89 degrees.

For these reasons, it is submitted that the "enablement" rejection of claims 25-27 should be withdrawn.

Claim Rejections 35 U.S.C. §103(a)

The Examiner rejects claims 1, 8, 12 and 25 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 3,659,899 ("Phillips") in view of the owner's manual of a dock leveler to Kelley dated 5/10/78 ("Kelley"). The Examiner also rejects: (i) claim 3 under 35 U.S.C. §103(a) as being unpatentable over Phillips in view of Kelley and further in view of U.S. Patent No. 3,822,861 ("Scott"); (ii) claim 4 under 35 U.S.C. §103(a) as being unpatentable over Phillips in view of Kelley and further in view of Australian Patent No. 588734 ("Beer"); (iii) claims 6 and 7 under 35 U.S.C. §103(a) as being unpatentable over Phillips in view of Kelley and further in view of U.S. Patent No. 3,784,255 ("Smock"); and (iv) claims 9-11 under 35 U.S.C. §103(a) as being unpatentable over Phillips in view of Kelley and further in view of U.S. Patent No. 3,902,213 ("Phleger").

Phillips discloses a loading dock that includes a loading platform. The longitudinal platform includes a pit that has a floor. A ramp is pivotally attached to the platform adjacent to the pit, and a bag is positioned under the ramp on the pit floor such that the bag raises the ramp when the bag is inflated. Kelley is cited by the Examiner to show a loading dock having a pit floor that is inclined upwardly and rearwardly toward the rear edge of the pit. The Examiner states that it would have been obvious to one in the art at the time the invention was made to incline the floor of the Phillips pit to facilitate the drainage of liquids.

In response, Applicant notes that there is no motivation to modify the pit floor disclosed in Phillips to include an incline such as the one disclosed in Kelley because no drainage is

necessary from the pit floor shown in Phillips. The ramp disclosed in Phillips covers the pit and prevents rainwater from collecting in the pit or on the pit floor. Further, even if rainwater could accumulate in the pit through the narrow slits located along the lateral edges of the ramp, the bag completely covers the pit floor and therefore it would be almost impossible for water to collect on the pit floor. Because no motivation exists to incline the pit floor of Phillips, Applicant submits that independent claim 1 is allowable.

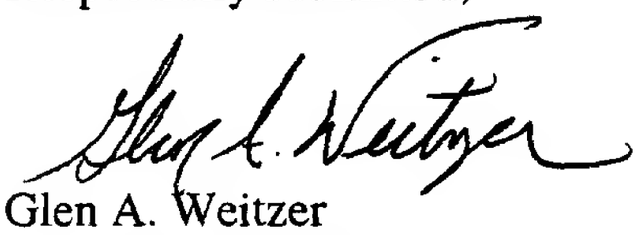
Claims 3, 4, 6, 7, 9-12 and 25 depend from claim 1 and are therefore also allowable because they more narrowly define the scope of the invention and because they recite additional limitations not found in the cited references.

New claim 28 recites a loading bridge and loading platform assembly for making a connection between the loading platform and a vehicle. The assembly includes a pit floor, a substantially planar member, an inclined base, and a pivot means. The pit floor is located within the loading platform. The planar member is pivotally connected to the loading platform and capable of bearing a load. The planar member includes a rear edge portion and a front edge portion. The rear edge portion of the planar member is hinged along a surface of the loading platform and the front edge is movable in a direction that is perpendicular to the surface of the loading platform. The inclined base is positioned under the substantially planar member and above the pit floor. The pivot means for pivoting the planar member includes an inflatable flexible body that is positioned on the inclined base.

None of the cited references, individually or in combination, disclose the subject matter of claim 28. Therefore, it is submitted that claim 28 is allowable.

The Examiner is invited to contact the undersigned attorney should the Examiner have questions regarding the above.

Respectfully submitted,



Glen A. Weitzer
Reg. No. P-48,337

File No. 53142/9086
Michael Best & Friedrich LLP
100 East Wisconsin Avenue
Milwaukee, WI 53202-4108
(414) 271-6560

APPENDIX A

Marked-Up Version of the Replacement Paragraphs for the Specification
(Relative to the Patent)

Application No. 09/598,785, filed June 20, 2000, is a continuation of this reissue application which is a continuation of Application No. 08/532,415, filed September 22, 1995, now abandoned.

The present invention relates to a bridge for making a connection between a loading platform and a vehicle, wherein the bridge is hingedly connected to the platform, and wherein the height of the bridge at the side of the vehicle is variable.

Such loading bridges are generally known. Often these loading bridges are driven for their vertical movement through a hydraulic apparatus. In such devices, a cylinder is provided between a fixed point and a point of the bridge, so that the loading bridge can be moved in the vertical direction and can even be locked.

Also loading bridges are known, which are operated by hand, and which rest at the movable side on the loading floor of the vehicle.

All of these known loading bridges have a number of disadvantages; for example manually operated loading bridges can only be applied until a certain weight, as otherwise they become too heavy and cannot be moved by human power.

Big loading bridges, which often comprise a hydraulic drive, have the disadvantage [,] that these hydraulic apparatus are rather costly, so that the price of such loading bridges is substantial. The same disadvantage [does] also exists [exist] when the loading bridge is driven by an electric motor and a rack and pinion.

The present invention provides [tries to provide] such a loading bridge, which can be provided with a driving mechanism for a relatively modest cost, despite its substantial dimensions.

This aim is achieved, in that under the bridge a flexible body has been provided of which the volume of the flexible body increases when it is filled with a gas.

As the price of such [as] a flexible body is modest, and the filling thereof requires only low priced equipment [, of which the price is low], a rising mechanism for such a bridge is provided, which can be manufactured for a [against] modest cost [costs]. Thus the cost of such a loading bridge [are] is decreased considerably. In this respect the remark is made, that the bridge only has to be lifted in its unloaded condition; hence there is no need for substantial power, so that relatively light and simple pneumatic apparatus is satisfactory.

Subsequently the present invention will be elucidated with the help of the accompanying drawings, wherein:

FIG. 1: is a schematic perspective view of a closed loading platform comprising a loading bridge;

FIG. 2: is a schematic exploded view of a first embodiment of a loading bridge according to the present invention;

FIG. 3: is a schematic cross-sectional view of the first embodiment of a loading bridge according to the present invention;

FIG. 4: is a schematic perspective view of a second embodiment of a loading bridge according to the present invention;

FIG. 5: is a cross-sectional view of an alternative embodiment for the controlling mechanism of the lid of the loading bridge according to the present invention; and

FIG. 6: is a perspective view partially broken away of a third embodiment of the present invention; and

FIG. 7: is a cross-sectional view, partially as a side view of the embodiment depicted in FIG. 6.

The loading platform 1 depicted in FIG. 1 comprises a pit 2, in which a loading bridge 3 has been provided. In the present case the loading platform 1 is covered [, i.e. that] by a wall 4 [has been provided, wherein] and a roll down shutter 5 which has been provided in the wall at the location of the loading bridge 3.

A vehicle to be loaded, for instance a lorry, drives with its rear side as close as possible against the loading platform 1, wherein the rear side of the lorry hits the buffer 6. Then the roll down shutter 5 is moved upwardly, and the height of the loading bridge 3 is adapted to the height of the rear side of the lorry, so that the lorry [this] can be loaded easily. It is convenient to drive into the lorry from the loading platform with for instance fork lifts.

FIG. 2 shows an exploded view of such a loading bridge according to the present invention. The loading bridge comprises a housing, which is composed of two fixed sides 7, which have been folded zigzag-wise, and also a rear wall 8. The rear wall comprises reinforcement pieces 9, which are mutually connected through bars 10. When providing such a loading bridge in a loading platform, the loading bridge is located as a whole in a desired position [on the right spot], after which the loading platform is formed in concrete. Thus the sides 7, the rear wall 8, the reinforcement pieces 9 and the bars 10 function as a lost formwork.

The [Into the] housing [thus obtained] supports a base 11 [is provided], which comprises a substantially horizontal part 12 and a part 13 extending obliquely downward to the front at an angle θ of about twenty-two degrees (See FIG. 3). Angle θ as illustrated in FIG. 5 is about

fifteen degrees. Also the bottom of the base 11 comprises a front wall 14 extending obliquely upwardly. The loading bridge per se comprises a movable plate 15, which is manufactured of steel or aluminum: and to the lower side thereof reinforcement ribs 16 have been welded. Further a round rod 17 has been welded to the under side of the plate 15, which rests in an array of substantially L-shaped hooks 18 welded against the back wall 8. Finally a filling piece 19 has been welded against the lower side of the plate 15, which filling piece 19 can be manufactured from a steel box or may be composed of rather light material, like tempex.

At the lower side of the plate 15 a lid 21 has been hingedly connected by means of hinges 20.

In the space between the filling [falling] piece 19 and the oblique part 13 of the base 11 [bottom], a flexible bag or bellows 22 has been provided, which may be manufactured from for instance polyethylene. The form of this bag is such that it fits in the space thus provided. Further this bag comprises a connection 23, which fits into a hole 24 provided in the bottom. Through this connection a gas, for instance air can be supplied, and which can fill the bag 22, so that the bridge 15 is raised [rasied] thereby.

The cross-sectional view shown in FIG. 3 shows how the bag 22 is locked up in the space between the oblique [olique] part 13 of the bottom and the filling piece 19. The bag may be connected with the lower side of the filling piece by for instance adhesive or buttons 60. Further it is shown how a ventilator 26 can blow up the bag 22 through a tube 25 against the spring pressure of a one-way valve 27. Further a valve 28 with pressure dependent action has been provided in the tube, which lets a part of the air flow out when the pressure in the bag becomes too high, so that the loading bridge under a changing load, for instance the driving on and off a

fork lifter, does not suddenly jump upwardly. Instead of a ventilator, a compressor with a venturi can be used.

Further in the drawing it is shown how the vehicle lift 29 can be moved from a lorry 30 until under the space under the apparatus, so that it does not interfere the loading and unloading. To avoid wear of the bag during the movement of the loading bridge, the front wall 14 thereof is formed such, that the bag wall rolls off or on, when moving the loading bridge. The same feature has been applied with the side walls; the wall of the bag rolls as a membrane on or off against the side wall 19. Besides these side walls 19 serve to protect the bag, 22 in the highest position of the loading bridge.

Further it is shown in this figure how the lid 21, which is connected [connnected] with the bridge 15 by means of a hinge 20, is provided with [of] a rod mechanism 31, that provides for the fact, that the lid 21 is usually in its inward position, whereas when reaching the highest position of the loading bridge the rod mechanism forces the lid upwardly, so that this is in the position shown with drawn lines in the figure, after which the loading bridge may descend until the position, in which this connects on the loading floor of the lorry 30, and rests on the frame of the lorry or on the loading floor thereof. The lid 21 is kept in this position by a cam 32 welded thereon by a folded rod 33, which is connected with the loading bridge 15 by means of a hinge 34, and a rod 35 connected hingedly with the other side thereof, which rod comprises a thickening 36 at its lower side. [Further this] The rod 35 extends through an aperture [apetture] in the front plate 14.

When reaching the upper position of the loading bridge, the thickening 36 in the rod 35 exerts a force to the folded rod 33, so that the folded rod 33 moves the lid 21 to its extended

position. This position is maintained by the cam 32 when the loading bridge moves [moving] downwardly.

In FIG. 4 another embodiment of the loading bridge is shown, in which another plate 15 of the loading bridge, a network of thin metal strips 36 have been provided, so that a honeycomb-like structure develops. This results in a lighter construction of the reinforcement of the loading bridge, which may considerably reduce the costs thereof. This construction is only allowed because [becuase] the forces of the loading bridge are borne by the whole underside thereof, so that the construction for the concentrating of the forces to one point, which was necessary when using a hydraulic drive, is superfluous. This has of course a very favorable outworking on the price. Further this loading bridge comprises a rod system 37 and a spring 38, which also provides that during the descending only of the loading bridge the lid 21 is in its extended position. Further the bag can be made so large, that is pushes directly against the lower side of the bridge and makes the filling piece superfluous.

In this embodiment, a front skirt 52 and side skirts 53 are provided extending downwardly form the underside of the bridge. When the bag is deflated, it is folded within the front and side skirts, and the front skirt is adjacent the front wall 14. As the bag is inflated, side portions of the bag are played out off of the skirts onto the front wall and the side walls of the housing.

This is further elucidated with the help of FIG. 5. When moving upwardly, the compression spring 38 will urge the rod system 37 outwardly, which is avoided by the cam 39. When the bridge has reached its highest position, the chain 40 will pull [pulll] the rod system 37 downwardly and outwardly, so that the lid 21 is urged to its extended position. During the

following the descending of the bridge, the rod system 37 will be received by a top 41, which urges the rod system and the spring 38 back to their original positions.

Of course a lot of other possibilities are available for the controlling of the lid 21.

In the embodiment of the loading bridge depicted in FIG. 6 and 7 the bag 22 has been replaced by a bellows 41, such as an air spring.

The [Besides the] construction of this embodiment of the loading bridge 3 is substantially equal to the embodiment depicted in FIG. 1-3. The present embodiment is different, because no bag exists and therefore no housing [,] in which the bag 22 is enclosed is necessary [, as there is no question anymore of a bag]. The only reason for nevertheless applying a full housing is the use thereof as lost formwork. This is of course also possible together with the application of a bellows.

A [Instead thereof a] frame 43 is used, of which the plate 15 of the loading bridge is provided hingedly, in a way substantially as in the first embodiment. For bearing the load of the frame on the base two brackets 44 have been provided. Further in this embodiment the plate 15 is reinforced by spars 42. The bellows rests with its bottom on the horizontal part of the bracket 44, whereas the top thereof is connected with a plate 45, being connected with the two middle spars 42.

Further the side wall of the loading bridge is composed of plates 19, which avoid, that part of the body that becomes [become] squeezed between the frame and the bridge.

Besides the construction of the bellow that is depicted in FIG. 7. The bellows 41 comprises a bottom plate 46, which is connected on the horizontal part 44 through an intermediate piece 47. The bellows per se, which is composed of a flexible bag 48, for instance

made of rubber or of plastic, is connected with the base plate 46 and a top plate 49. To avoid extension of the bag 48 in the horizontal direction two rings 50 have [ve] been provided.

Through a pipe 51, extending through the intermediate piece 47 and the base plate 46 a gas, for instance air can be supplied to make the volume of the bag 48 increase. In view of the supply of air or a gas refer [referred is] to the embodiment described with the help of FIG. 3. [Besides several] Several features of the different embodiments can be mutually combined.

APPENDIX B

Marked-Up Version of the Amended Claims (Relative to the Patent)

1. (Twice amended) Loading bridge for making a connection between a loading platform and vehicle, comprising:

a substantially planar member pivotally connected to the loading platform and capable of bearing a load, wherein a rear edge portion of said substantially planar member is hinged along a surface of the loading platform, and wherein a front edge is movable in a direction perpendicular to said surface of the loading platform; [and]

an inclined base positioned under the substantially planar member, and

pivot means for pivoting said substantially planar member, said pivot means comprising an inflatable flexible body positioned on the inclined base.

25. (Amended) A loading bridge as claimed in claim 1, wherein said inclined base is inclined between one and eighty-nine degrees.

26. (Amended) A loading bridge as claimed in claim 1, wherein said inclined base is inclined between five and eighty-nine degrees.

27. (Amended) A loading bridge as claimed in claim 1, wherein said inclined base is inclined between fifteen and eighty-nine degrees.

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